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AUTHOR Blau, Eileen Kay
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ABSTRACT

A study of the effect of function words on reading comprehension had as subjects 99 college students of English as a second language (ESL) divided into four groups. The treatment was the reading of a set of passages, written in four versions. In version 1 all function words were deleted; in version 2 function words with semantic weight were retained; in version 3 the same number of function words were retained as in version 2, but were randomly selected; and in version 4 the full text was used. Comprehension of the passages was measured by a multiple choice comprehension test. Results showed no significant difference between the comprehension scores yielded by versions 2 and 4 or between those of 1 and 3. However, the scores for versions 2 and 4 were significantly higher than for 1 and 3, indicating that function words carrying a semantic load contribute to reading comprehension for ESL students while those that are lexically empty, although essential for grammatical correctness, do not contribute to reading comprehension for this population. (Author/MSE)

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Eileen Kay Blau
Department of English
University of Puerto Rico
Mayaguez, Puerto Rico 00708
U.S.A.
Home telephone: (809) 834-1272
Work telephone: (809) 834-4040 ext 2505

The Function of Function Words in Reading Comprehension

ABSTRACT

The effect of function words on reading comprehension for university ESL students was investigated in this study. A set of passages was written in four versions. In version 1 all function words were deleted. In version 2 function words with semantic weight were retained. Version 3 contained the same number of function words as version 2, but in this version the deleted function words were randomly selected. Version 4 was the full text. Comprehension was measured by a multiple choice comprehension test.

There was no significant difference between the comprehension scores yielded by versions 2 and 4. Nor was there a significant difference between the comprehension scores yielded by versions 1 and 3. The scores for versions 2 and 4, however, were significantly higher than those for versions 1 and 3 indicating that function words that carry a semantic load contribute to reading comprehension for ESL students while those that are lexically empty, though essential for grammatical correctness, do not contribute to reading comprehension for this population.

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Despite a substantial amount of research in reading, there are still unanswered questions about precisely what makes text comprehensible. Awareness of the factors involved in text comprehensibility seems to be broadening, in some cases beyond the text itself, to include such topics as cultural background (Johnson 1981, 1982), schema theory (Carrell and Eisterhold 1983), text base (Kintsch and Vipond 1979), and coherence (Beck, McKeown, Omanson, and Pople 1984). These are of great importance and interest, yet there are still questions about the more traditional text-bound issues of vocabulary and syntax. The latter are major factors in students' underlying L2 competence, factors that are positively though not exclusively associated with ability to read in a second language. Clarke (1978) has demonstrated that inadequate proficiency in a second language can cause a "short circuit" that prevents transfer of reading skills from one's first language to the second language. In our efforts to build up the necessary proficiency to prevent such short-circuiting and to enable our students to comprehend successfully in their second language, what features deserve emphasis?

Students themselves often believe vocabulary is the major factor in reading a second language (Yorio 1971). It is likely that they are thinking primarily of content words

(nouns, verbs, adjectives and most adverbs) when they make this judgment. But this may be a naive judgment. The role of vocabulary in reading is not as clear as one might expect (Johnson 1982, Freebody and Anderson, 1979, 1981, 1983, Jenkins, Pany, and Schreck, 1978). Without implying that the broader factors of readability mentioned above are considered unimportant, and at the risk of going against the mainstream in reading research today, this study is limited to a specific type of vocabulary that lies in an area where vocabulary and syntax come together.

Function words comprise an area of vocabulary that borders on grammar or syntax. According to Francis (1958:234), "Function words are words largely devoid of lexical meaning which are used to indicate various functional relationships among the lexical words of an utterance." In other words, they are the glue that holds content words together and include such words as pronouns, determiners, conjunctions, prepositions, and auxiliary verbs. They are high frequency "humble servants" (Francis 1958:231) that, at least in speaking and writing, appear to be a crucial part of language.

There may, however, be some question as to how crucial function words are in language skills that do not require production, i.e., listening and reading. Ulijn, believing that content words are salient carriers of conceptual information, states that it is "more important to know all

kinds of conceptual content words rather than syntactic function words" (1978:5). Consequently, he believes that a reading grammar can be more limited than a speaking or writing grammar. Bolinger refers to the "subordinate role of grammar" and states that "the most important thing is to get the words in" (1973:81). Indeed, in notetaking most people seem to omit many function words in an effort to get the message down in the briefest possible way. Likewise road signs, newspaper headlines and telegrams often eliminate function words for the sake of brevity without sacrificing comprehensibility. Hatch (1979:137) states, "If we can identify content words and if we use our knowledge of the real world, we can make fairly successful guesses about what we read without always paying attention to the syntax." Since most function words make more of a syntactic than a lexical contribution to an utterance or stretch of discourse, whether written or spoken, Hatch's statement implies that grammatical words are not essential in reading comprehension.

For years the most popular language teaching methodologies stressed mastery of the structure of language at the expense of vocabulary enrichment. A common belief was that once the skeleton was intact, meat could be put on the bones later on. However, the current rising popularity of semantically based rather than grammar-based syllabi tends to downplay the importance of syntax and morphology in

language teaching and is restoring the importance of vocabulary. The emphasis is on the message rather than its form. In fact, there is evidence (Sachs 1967, Bransford and Franks 1971) that humans comprehend linguistic material in terms of meaning rather than form. They remember ideas and quickly forget the exact form the ideas were originally packaged in. One must remember, however, that these studies deal with information storage and not with the pre-storage process of first extracting meaning in order to be able to store it. Can we get the message and thus extract the meaning for storage purposes without the help of syntax and morphology? In other words, just how crucial to comprehension are the links that hold the message together?

Despite Bolinger's comments that in most languages more grammatical relations are "inferred from covert semantic affinities than are overtly specified" (1973:82), Green (1979) has demonstrated the usefulness of "marker elements." In Green's study, miniature artificial languages were much more difficult to learn without markers or with useless markers than with effective markers. One would consequently suppose that function words and grammatical morphemes do indeed contribute to comprehension.

A study by Bassin and Martin (1976), using English-speaking college students as subjects, investigated the effect of reducing redundancy by eliminating high frequency, low information words. They found that

comprehension was not significantly impaired by 10 or 30% reduction, but 50% reduction did result in significantly lower comprehension. Reading rate also decreased significantly for 30 and 50% levels of redundancy reduction. Apparently, telegraphic style can be tolerated by native speakers to a certain extent. Nevertheless, these two studies indicate that function words, generally lexically empty syntactic markers, do help comprehension at least to some degree.

Few studies in reading look at both function and content words and until recently few have dealt with non-native speakers. One of the notable exceptions is Hatch, Polin, and Part (1974) who found that in a task requiring crossing out all e's, native speakers paid attention mainly to content words while university ESL students paid attention to both function and content words. Yet responses by both groups to comprehension questions were based principally on semantic interpretations. The implication is that non-natives tend to be less selective and probably less efficient in their reading. But is their attention to function words really extraneous, or do they in fact need to rely on the functions they perform as syntactic markers?

Sim and Bensoussan (1979) investigated the effect of function and content words on reading comprehension of EFL students in Israel. They assumed that EFL students would be equally handicapped without the ability to decode and

interpret function words as by the corresponding inability with content words. They found no significant difference between success on comprehension questions based on function words and questions based on content words, and they therefore concluded that "interpreting function words is no less important a lexical skill than content-word decoding or interpretation" (Sim and Bensoussan 1979:40).

Although Sim and Bensoussan do not sub-categorize types of function words, there is some indication that such sub-categorization may be justified. Tomiyana (1980) studied the effect on communication for native speakers of global errors involving connectors and local errors involving articles. It was found that readers could correct the errors involving articles more easily than those involving connectors, implying that not all function words are of equal importance in communication.

Function words represent redundancy in language, and there is some evidence that native speakers can tolerate a reduction in this redundancy and in fact select some of it out themselves in rapid reading. While the Sim and Bensoussan study suggests that function words may be as important to reading comprehension for non-natives as are content words, the role of function words in the reading comprehension of non-native speakers has not yet been adequately investigated. The purpose of this study is to further investigate the function of function words in the

reading of non-native speakers and in so doing to seek justification for categorizing function words into more than one type in order to gain an even clearer picture of their effect on reading comprehension.

Materials

The instrument developed to measure the effect on reading comprehension of omitting different types of function words consisted of nine short reading passages and 23 multiple choice comprehension questions. The passages varied in topic: two were humorous anecdotes; one was a passage from a college biology textbook; three were word problems from a college level pre-calculus textbook; two were adapted from the SRA reading kit (Thurstone 1969), and one was from a college textbook on marketing. Each passage was written in four versions varying in degree of mutilation while comprehension of all versions was measured by the same comprehension questions.

In version 1 all function words were deleted. Determiners, pronouns - including relative pronouns and interrogative words, conjunctions, transition words that are not clearly adverbs, prepositions, auxiliary verbs, copulas and existential <u>there</u> were all deleted in this version, the most mutilated version. However, particles on phrasal verbs were not deleted as phrasal verbs were considered units. In version 2 function words that carried apparent semantic

weight were not omitted. These included subordinating and some coordinating conjunctions, modal auxiliaries, quantifiers - including more...than, most, as as used in constructions of comparison, certain prepositions such as after, without, behind. certain pronouns such as everyone, someone, something, others and transition words like thus and therefore. In order to determine whether this second version which yielded higher comprehension scores than version 1 in a pilot study did so because fewer words were deleted than in version 1 or because of the semantic significance of the function words that were retained, a third version was created. Version 3 had the same number of function words retained as version 2. However, in version 3 the function words were randomly selected using a table of random numbers. The fourth version was the full text. (See Appendix for sample passages.)

Table 1 indicates the number of words in each passage for each version. In the full texts of these passages function words accounted for 40-56% of the total number of words. The full 40-56% were deleted to create version 1. The function words with semantic weight that were retained in version 2 involved from 12-38% of the total number of function words. Creating both version 2 and version 3 involved, in each case, deletion of 26-49% of the words of the full text, still a substantial proportion.

(Insert Table 1)

Subjects

The sample consisted of 99 students in four sections of the final required English course at the Mayaguez Campus of the University of Puerto Rico. Twenty-eight of the subjects were freshmen while the majority of the remainder were sophomores. Any subjects from homes wnere English was spoken were eliminated from the study leaving from 23 to 28 students in each of the four treatment groups.

Design and Procedure

Subjects were randomly assigned to one of the four treatment groups described above. They read the appropriate version of the passages and responded to the comprehension questions during a regular class period. All were able to complete the task within the allotted time.

The comprehension scores for the four treatment groups were subjected to the Fmax test for homogeneity of variance (Kirk 1968:62) before comparing the group means by analysis of covariance. The ESLAT, a grammar and reading comprehension test administered by the College Board to high school seniors in Puerto Rico, was used as the covariate. The covariate was intended to control for varying degrees of English proficiency in order to better detect the true effect of the treatment. ESLAT scores ranged from 301 to 747 with a maximum possible score of 800. The Pearson

Product-Moment Correlation Coefficient between the covariate and the comprehension scores was .422.

Results

As the Fmax test was not significant, the data were analyzed by analysis of covariance. Table 2 indicates that the treatment effect, that is the effect caused by the degree and manner of altering the reading passages, was significant ($p < .01$).

Table 3 shows the means adjusted for the effect due to proficiency as measured by covariate scores.

(Insert Tables 2 and 3)

Post hoc pairwise comparisons were performed on the adjusted means using Finney's approximation to the mean square error (Cochran and Cox 1957:87). The post hoc procedure used was Fisher's Significant Difference test in which significance level is reduced for the individual t-tests to yield an experiment-wise alpha level of less than .01. These comparisons indicated that there was no significant difference between the comprehension scores of the group reading the full text, version 4, and the group reading version 2 with the semantically weighted function words retained. Nor was there a significant difference between the scores of the group reading version 3, with the same number of words deleted as in version 2, and the group reading version 1, the most mutilated version with all

function words deleted. Versions 2 and 4 yielded significantly higher comprehension scores than versions 1 and 3 ($p < .01$).

Discussion

It is not surprising that those reading the full text had the highest comprehension scores while the most mutilated version yielded the lowest scores. Version 1 passages admittedly make for rather peculiar looking English though not noticeably moreso than version 2 which yielded comprehension scores that were not significantly different from those of the full text. Comments of students who read versions 1 and 2 in a pilot study were similar - condensed, confusing, rather difficult to read - despite significant differences in comprehension scores between those two versions.

Success in reading version 2 indicates that non-natives, like natives (Bassin and Martin 1976), can tolerate a fair amount of elimination of comparatively predictable high frequency, low information words. However, relative lack of success in comprehending version 3 with no more function words deleted than version 2 indicates that there is a question of quality rather than mere quantity involved. Clearly, the usefulness of function words to ESL readers is not evenly distributed. These findings justify the division of function words into at least two classes.

The lexically empty, usually local function words, including articles, most auxiliaries, most prepositions and pronouns, may be essential for English to look and sound like grammatically correct English, but they carry little weight in helping ESL readers comprehend as demonstrated by the lack of difference between version 2 and version 4 scores. Version 2 lacks function words that are non-essential to, or at least not utilized for getting the message while retaining those that apparently are essential. The former probably constitute those function words that we can safely leave out in notetaking, road signs, headlines and telegrams.

The second category of function words, those that seem to be essential for comprehension, are also grammatical words, but they are not truly low in information. They carry more of a semantic load than the function words in the first category. These crucial function words include conjunctions and transition words that carry relational meaning, modal auxiliaries, quantifiers including the words used to form constructions of comparison, indefinite pronouns and certain prepositions.

Apparently some of the links that hold a message together are more important than others. This second category of more important function words, then, constitutes material that teachers should emphasize in their efforts to enable students to comprehend what they read. Constructions

of comparison may fall under the tradtional heading of grammar or structure. The meanings of modals, conjunctions, transition words, prepositions and indefinite pronouns, on the other hand, straddle the fence between grammar and vocabulary, but it is probably their vocabulary-like characteristics, the semantic load they carry, that are important in the process of text comprehension.

In view of the fact that vocabulary is one of the principal ingredients in second language proficiency and that such proficiency is one of the necessary prerequisites for efficient second language reading, we must be certain, when "getting the words in," to include those function words that serve as effective message carriers.

Table 1

Words per Passage and Percentages of Function Words

Passage	Words in v.4	Words in v.2 & v.3	Words in v.1	Function Words as % Total Words	Function Words with Semantic Weight as % Function Words
1 (anecdote)	146	89	80	45%	14%
2 (anecdote)	151	85	75	50%	13%
3 (biology)	137	96	79	42%	29%
4 (math)	34	25	20	41%	36%
5 (math)	45	30	27	40%	17%
6 (math)	43	30	22	49%	38%
7 (SRA)	45	23	20	56%	12%
8 (SRA)	55	34	30	45%	16%
9 (marketing)	326	210	188	42%	16%

Table 2

Analysis of Covariance

Reading Comprehension Score as Dependent Variable and ESLAT as Covariate

Source	df	SS	MS	F
Treatment	3	302.26	100.75	12.279*
Covariate	1	194.24	194.24	23.674*
Error	94	771.244	8.205	

*$p < .01$

Table 3

Adjusted Means

Treatment	N	Adjusted Mean
Version 1	23	12.04
Version 2	28	15.05
Version 3	23	12.95
Version 4	25	16.56

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APPENDIX

Sample Passage

Version 1

Skating rink 100 feet long 70 feet wide. Increase area 13,000 square feet adding rectangular strips equal width one side one end maintaining rectangular shape, width strips?

Version 2

Skating rink 100 feet long 70 feet wide. Increase area to 13,000 square feet adding rectangular strips equal width one side one end while maintaining rectangular shape, should width strips?

Version 3

A skating rink 100 feet long 70 feet wide. Increase area 13,000 square feet adding rectangular strips equal width one side one end maintaining rectangular shape, should the width strips?

Version 4

A skating rink is 100 feet long and 70 feet wide. To increase its area to 13,000 square feet by adding rectangular strips of equal width to one side and one end while maintaining its rectangular shape, what should the width of the strips be?